1 **METHOD OF OPERATION**
2 **HAVING FRANGIBLE OR FUSIBLE PART OR CONNECTION**
3 **ACTUATION DIRECTLY RESPONSIVE TO MAGNETIC OR ELECTRICAL EFFECT**
4 **ROTARY SKIN FRICTION TYPE (E.G., MAGNUS ROTOR, ETC.)**
5 **WITH ILLUMINATION MEANS**
6 **DRIVEN BY PULSATING OR DIVERSE WORKING FLUID**
7 **WORKING MEMBER SUPPORTED ON ENDLESS FLEXIBLE CARRIER**
8 .Feathering blades
9 **WITH MEANS POSITIONING FLUID CURRENT DRIVEN IMPELLER RELATIVE TO FLOW DIRECTION**
10 .Offset relative to flow direction
11 ..Upstream pivotal mounting
12 ..Responsive to folding or feathering of flow-aligned vane
13 ..Horizontal deflection relative to flow-aligned vane
14 ...With impeller brake or stop
15 ...And responsive to transverse vane
16 ...Biased to position by weight of parts
17 .Feathering cycle related to flow direction
18 **WITH GYROSCOPIC REFERENCE MEANS FOR ROTOR CONTROL**
19 **SINGLE BLADE ROTARY IMPELLER WITH COUNTERBALANCE**
20 R **DRIVE BY FLUID REACTION JET ON WORKING MEMBER**
21 .Combustion chamber carried by member
22 ..Air-ingestion rotor tip unit
20 A .Articulated or flexible connection
23 **WITH MEANS MOVING WORKING FLUID DEFLECTING WORKING MEMBER PART DURING OPERATION (E.G., AILERON, ETC.)**
24 .Cyclic movement of member or part
25 **INTERRELATED CONTROLS FOR IMPELLER AND DRIVE MEANS**
26 .Pitch adjustment related to drive brake or clutch operation
27 .Pitch adjustment and throttle regulation with condition sensing means
28 ..Temperature responsive control
29 ..Drive engine intake air responsive control
30 ..Electrical control or sensing means
31 **WITH CONTROL MEANS RESPONSIVE TO NON-CYCLIC CONDITION SENSING, CENTRIFUGAL ACTUATION, TORQUE OR THRUST**
32 .Control of drive brake or clutch
33 .Plural distinct impellers having related control
34 ..Synchronizing
35 .With electrical means comparing and reducing error related to preset datum
36 .Plural diverse condition responsive
37 ..Relative ambient condition sensing (e.g., temperature, density, wind force, etc.)
38 ..Drive engine condition excluding shaft speed or torque
39 .Temperature or icing condition responsive
40 .Responsive to relative working fluid velocity
41 ..Natural fluid current
42 .Pressure or altitude responsive
43 .Responsive to condition of torque or thrust of device or driving or driven means or mechanism
44 .Impeller rotation speed responsive
45 ..Valve element directly movable by centrifugal force
46 ..Including pitch lock or adjustable stop
47 ..Control by means of separate motor
48 ...Motor carried by impeller
49 ..Including reset or manual override of control
50 ...Of centrifugal weight governor
51 ..Centrifugal mass moved along guided or lineal path
52 ..Centrifugal mass coaxial with impeller

53 ...Pivot axis parallel to rotation axis
54 **OPERATED BY ART DEVICE**
55 .Vehicular device
56 .Runner supported rocking device
57 ..Inertial actuation
58 ..Continuous impeller rotation
59 .Pivot supported swinging device
60 .Integral with or directly attached to rotary device or part (e.g., flywheel, pulley, etc.)
61 **WITH MEASURING, TESTING, SIGNALLING OR INSPECTION MEANS**
62 **REMOVABLE AUXILIARY ATTACHMENT TO WORK SURFACE**
63 **AMBULANT, BODY SUPPORTED OR WITH CARRYING HANDLE**
64 **TRANSLATORY REACTION MOTION**
65 .And concurrent rotary reaction motion
66 .Flexible or relatively movable working member or part
67 ..Valve type
68 ..Complemental pivoted surfaces
69 **OPERATOR SUPPORTED MANUALLY ACTUATED TYPE**
70 R .Operation solely by direct hand manipulation
71 ..Simulation or having indicia, ornamentation or combined feature
72 ..Relatively movable portions
73 ...Arcuate planar folding of working surface
70 A ..Fans
74 .Fulcrum support type (e.g., oar, scull, etc.)
75 .Reciprocatory pin-slot actuator
76 .Rotary hand crank (e.g., egg beater, etc.)
77 ..Intermeshing or interdigitated working members
78 **CRANK TYPE DIPPING OR STIRRING MOTION**
79 **OSCILLATORY REACTION MOTION**
80 .With pendulum, counterbalance or inertial weight
81 .Flexible working member
82 .Relatively movable working member portions
83 .Compound motion (e.g., feathering, undulating, etc.)
84 **BUOYANT OR INFLATABLE WORKING MEMBER**
85 **FLOAT SUPPORTED**
86 .Buoyant hub or rim
87 **RADIALLY EXTENSIBLE OR RETRACTIBLE ROTOR WORKING MEMBER**
88 .Variable work surface or non-rigid connection
89 .Having pitch adjustment
90 R **WITH FLUID PASSAGE IN WORKING MEMBER COMMUNICATING WITH WORKING FLUID**
91 .Both inlet and outlet to working fluid
92 .Discharge solely at periphery normal to rotation axis
90 A .Air and watercraft propellers
93 R **AMBIENT FLUID OR EXHAUST GAS DIRECTED THROUGH HUB, FAIRING OR HOUSING**
94 .Aircraft spinner or cowling
93 A .Water or marine propellers
95 **WITH HEATING, COOLING OR THERMAL INSULATION MEANS**
96 R .Changing state mass within or fluid flow through working member or carrier
97 R ..Flow exhausted to working fluid
97 A ...Laminated or porous skin
96 A ..Blade inserts
98 **SUSTAINED ANCILLARY MOVEMENT OF ROTARY WORKING MEMBER (E.G., CYCLIC FEATHERING, ETC.)**
99 .Intermounted rotary members
100 .Continuous rotor oscillation
101 .Cyclic radial movement
102 .Responsive to carrier tilt
103 .Lead-lag type rotor blade movement
104 ..And additional correlated blade movement (e.g., pitch change, etc.)
105 ..Positive means effecting lead-lag movement
106 ..With movement restraining means (i.e., damping)
107 ...Resilient bias or limit stop
108 .By actuator eccentric to rotation axis
109 ..Stationary eccentric guide or track
110 .Continuous rotation about plural axes

111 ..Motion about parallel axes
112 .Responsive to fixed actuator (e.g., cam or trip, etc.)
113 ..Axial cam
114 ...Selectively adjustable
115 ....Plural impellers
116 ..Stationary cam track or guide surface
117 .Responsive to gravity or working fluid force
118 ..Having manual control or adjustment
119 ..Motion about parallel axes
120 **PLURAL IMPELLERS HAVING RELATIVE MOVEMENT OR INDEPENDENT SUPPORTS**
121 .Shiftable support
122 .Intersecting or interdigitated paths of operation
123 .Divergent rotation axes
124 .Coaxial rotation
125 ..Individual prime mover
126 ..Concentric working members
127 ..Concurrent adjustment
128 ..Oppositely rotating impellers
129 ...Engine driven
130 .Differential or independent adjustment
131 **ARTICULATED, RESILIENTLY MOUNTED OR SELF-SHIFTING IMPELLER OR WORKING MEMBER**
132 R .Sectional, staged or nonrigid working member
132 A ..Flexible sheet or plate
132 B ..Windmills
133 .Axially displaceable rotary carrier (e.g., hub, etc.)
134 R .Nonmetallic resilient mounting
134 A ..Aircraft rotors
135 .Resilient bias or mount
136 ..Rotary working member pivotable solely about radial axis
137 ...Convolute spring coaxial with impeller shaft
138 ..With manual control means
139 .Including weight bias means
140 .Including movement limit stop or damping means
141 .Plural articulation
142 **WORKING MEMBER FOLDABLE, PIVOTABLE OR COLLAPSIBLE TO NON-USE POSITION**
143 .Member movement in rotation plane
144 **WITH WEIGHT-BALANCING MEANS**
145 .Self-shifting or selectively adjustable mass
146 R **COMBINED OR CONVERTIBLE**
146 A .Hub lubrication or seal
147 **HAVING POSITIVE MEANS FOR IMPELLER ADJUSTMENT**
148 .Tiltable carrier (e.g., hub, etc.)
149 .Shiftable carrier support
150 ..Rectilinear motion
151 .Power derived from impeller shaft
152 ..By brake application or release
153 .Having pitch lock or adjustable stop
154 ..Fluid motor for impeller adjustment
155 .Motor bodily rotatable with impeller hub or shaft
156 ..Fluid motor
157 R ...Coaxial with impeller shaft
157 A ....Rotary fluid motor
157 B ....Plural blade units
158 ...Working member mounted or housed
159 .Power or manual actuator on non-rotatable part
160 ..Planetary gearing connecting rotatable and non-rotatable parts
161 ..Axially movable impeller
162 ..Having motor
163 ..Adjustment rod through entire impeller shaft
164 ..Reciprocating sleeve or collar on or rod in impeller shaft
165 ...Reciprocated by coaxial screw
166 ...Rack-pinion connection to working member
167 ...Pin-slot or cam-slot connection to working member
168 R ...Link connection to working member
168 A ....Turbo-machine
169 R **HAVING CLUTCH OR BRAKE MEANS**
169 A .Engine cooling fans
170 R **SPECIFIC DRIVE OR TRANSMISSION MEANS**
171 .Impeller driven by fluid motor
172 .Alternating rotation
173 .Manual powered means
170 HM .Hand mixers

174 **HAVING LUBRICATING, SEALING, PACKING OR SPECIFIC BEARING MEANS BETWEEN IMPELLER OR SHAFT AND STATIC PART**
175 **DIVERSE IMPELLERS OR WORKING MEMBERS**
176 **SPIRAL BLADE OR FLOW PASSAGE (360 DEGREE)**
177 .Flow confining casing, shroud or passage
178 **PERIMETRIC BLADING EXTENDING AXIALLY BETWEEN ANNULAR MEMBERS (E.G., SQUIRREL CAGE TYPE, ETC.)**
179 **ROTOR HAVING FLOW CONFINING OR DEFLECTING WEB, SHROUD OR CONTINUOUS PASSAGE**
180 .Blades projecting axially from concavo-convex annular web
181 .Apertured or foraminous web or shroud
182 .Radially extending web or end plate
183 ..Circumferentially or radially angulated or discontinuous blades or sections (e.g., stepped, etc.)
184 ..Spaced intermediate ends of opposed axial flow impeller
185 ..Circumferentially and radially continuous web or end plate
186 R ...Having opposed annular surface between adjacent blades
187 ....Angularly spaced, axially elongated blades (i.e., squirrel cage type)
186 A ....Adjustable blade or part
188 ...Conical web
189 .Axially extending shroud ring or casing
190 ..Vibration inhibiting or expansion-contraction structure
191 ..Segmental shroud
192 ..Having radial flange
193 R ..Spaced inwardly of impeller periphery
193 A ...Root platforms
194 **LASHING BETWEEN WORKING MEMBERS OR EXTERNAL BRACING**
195 .Peripheral
196 R .Connecting adjacent work surfaces
196 A ..Non-turbo machine (windmills)
197 R **CUPPED REACTION SURFACE NORMAL TO ROTATION PLANE**
197 A .Air and water motors (natural fluid current)
197 B .Pelton wheels (impulse wheels)
197 C .Torque converters
198 R **MULTIPLE AXIALLY SPACED WORKING MEMBERS**
199 .Opposed axial flow
200 R .Circumferentially offset
200 A ..Turbo machine
201 R .Differing radii
201 A ..Non-turbo machine
198 A .Turbo machine
202 **PROJECTING BLADE AXIS OFFSET FROM ROTATION AXIS**
203 **UNSYMMETRICAL IMPELLER OR DISSIMILAR WORKING MEMBERS**
204 R **SPECIFIC WORKING MEMBER MOUNT**
205 .Adjustable
206 ..Spring biased detent
207 ..Blade releasably clamped
208 ...Split impeller hub
209 ..Thimble or sleeve fixed on impeller blade
210 R .Distally supported on radial arm
211 ..Axially extending blade
210 A ..Turbo machine
212 R .Interlocking blades
212 A ..Turbo machine
213 R .Welded, cemented or fused
213 A ..Non-turbo machine
214 R .Blade held between separable surfaces
214 A ..Turbo machine
215 .Blade received by continuous circumferential channel
216 ..Radially spaced ribs or grooves
217 ..Divided blade root
218 ..Having circumferentially extending binder
219 R .Blade received in well or slot
220 R ..Having blade locking means
221 ...Resilient or deformable
220 A ...Non-turbo machine
219 A ..Non-turbo machine
222 .Blade straddles carrier
204 A .Turbo machine
223 R **SPECIFIC BLADE STRUCTURE (E.G., SHAPE, MATERIAL, ETC.)**
224 .Having wear liner, sheathing or insert
225 .Having spanwise compression means

226 .Formed with main spar
227 R .Openwork (e.g., lattice, looped, etc.)
227 A ..Propeller and non-mixers
228 .Tined or irregular periphery
229 R .Laminated, embedded member or encased material
230 ..Wire, fiber, strand or fabric
229 A ..Turbo machine
231 R .Apertured or permeable
231 A ..Mixers or agitators
231 B ..Slotted blade
232 .Hollow
233 ..Having brace means bridging cavity
234 .Integrally shaped or blended into hub
235 .Irregular, flanged or channel forming blade surface
236 R ..Ribbed or grooved
236 A ...Concentric or circular ribs
237 ..Angular or offset
238 .Cantilever blade
239 .Blade cuff or shank construction
240 .Flexible
241 R .Coating, specific composition or characteristic
241 A ..Plastic or synthetic material
241 B ..Ceramic material
242 .Reverse curve surface
243 .Concave surface
223 A .Turbo machine
223 B .Radial flow devices
244 R **SUPPORT MOUNTING, CARRIER OR FAIRING STRUCTURE**
245 R .Spinner or fairwater cap
245 A ..Water or marine propellers
246 .Selectively adjustable impeller mount
244 A .Turbo machine
244 B .Water or marine propellers
247 R **PROTECTIVE SCREEN OR GUARD**
247 A .Water or marine propellers
248 **MISCELLANEOUS (E.G., BLADE ROOT OR ROOT BLOCK, ETC.)**

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DIG 7 **INLET AND OUTLET**
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DIG 9 **SAVONIUS**